Occupational HAZARDS

MAY 1940

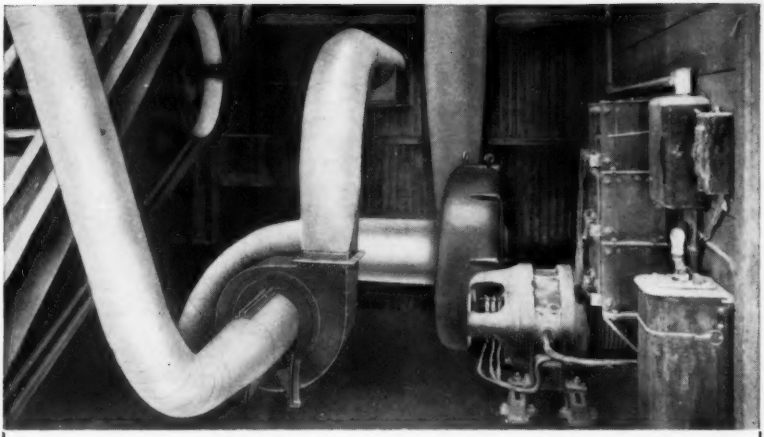
Articles of Interest to Management

LIBRARY OF CONGRESS
MAY 16 1940
TECHNICAL DIVISION

- Dust control pays out
- Salt keeps workers fit
- Protective equipment for electrical men
- X-ray a management tool
- Republic steel saves money—part II

The only management publication devoted exclusively to the engineering control of:

Dusts • Fumes • Vapors • Gases • Organic Solvents
Dermatitis • Industrial Sanitation
Industrial Health & Safety



Dust Masks *Eliminated and* Visibility Increased in Fertilizer Plant . . .

Dust from dumping, elevating and crushing rock, and fumes from dryers, required continuous wearing of masks and limited visibility in this plant. A specially designed Kirk & Blum System was installed to pick up dust and fumes at their sources. All masks have now been discarded. In addition, the increased visibility allows the workmen to move around with greater freedom and certainty.

If you have a dust or fume removal problem, why not let our engineers make a careful survey and recommend a solution? Write NOW for details of this service.

THE KIRK & BLUM MFG. CO. **2816 Spring Grove Ave., Cincinnati, Ohio**

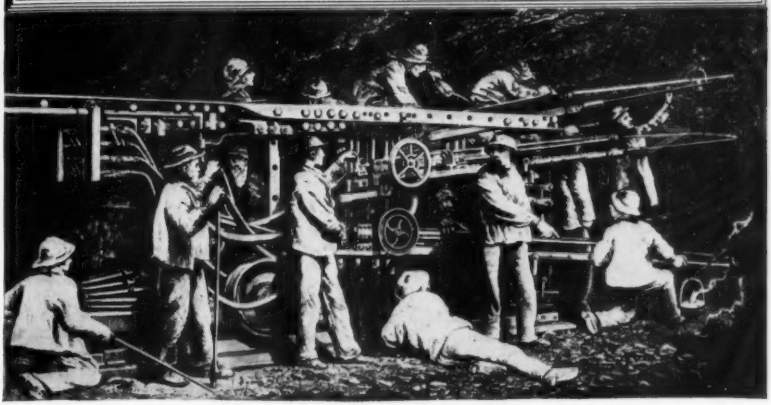
Chicago Representative: C. P. Guion, 1661 N. Milwaukee; Pittsburgh: Bushnell Mchy. Co., 311 Ross St.; Louisville: Liberty Eng. & Mfg. Co., Inc., 1450 S. 15th St.

KIRK & BLUM

DUST AND FUME CONTROL

ENGINEERS AND CONTRACTORS

Parade of Progress - No. 4



Pneumatic machine for digging tunnels. Introduced about 1869.

Frequently it is an inventor who starts the ball of progress rolling, but it is usually the far-sighted and progressive executive who must actually put the new techniques to work. Such executives know the importance of keeping abreast of new developments in order to participate in their benefits. In the field of foot safety, for example, there is a revolutionary new Plan which cuts accident losses—yet it involves not a penny of expense! Newly developed by America's largest shoe retailer, Thom McAn, this unique Plan has already been adopted in hundreds of the Nation's leading plants. Every executive responsible for safety should be informed about this Plan. The coupon below, will bring full details.

THOM McAN: SAFETY SHOE DIVISION
555 FIFTH AVENUE, NEW YORK, Dept. D-5

Without obligation, please send me full details of your Foot Safety Plan. If you will stock Safety Shoes for our plant in your own stores, at no risk or expense to us, and have your own trained men fit them, I want to know all about it.

.....
Company name

.....
Company address

.....
Executive's name

Absenteeism Audit to Cut Losses

AN ORGANIZED effort to reduce sick absenteeism throughout the heavy industries, source of staggering "hidden" losses to management and labor alike, is being launched by the Air Hygiene Foundation. The Foundation, with headquarters at Mellon Institute, Pittsburgh, is a national organization of manufacturing and mining concerns for the advancement of industrial hygiene.

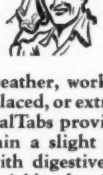
A preliminary report, "Sick Absenteeism in Industry," has just been released to the 200 member companies as the first step in the undertaking. Dr. A. J. Lanza, Medical Committee Chairman, points out in this report that "eight-plus days per male wage earner and 12-plus days per female worker per year is the average toll paid to disabling sickness and injury—a staggering total whether viewed from the point of health or of money loss and at least five times greater than the corresponding figure for industrial accidents."

Steps in Program

There are three steps in the program. First, the preliminary report which has been completed and which attempts to picture the problem for management. Secondly, the keeping of records on sick absenteeism by the participating companies on pre-

(Please turn to page 4)

A new guard against THERMOPLEGIA



Industry's heat plague that threatens profits and workers' health and lives

STERLING SALTABS prevent thermoplegia—"heat sickness" or "heat prostration." On hot jobs in all weather, on all jobs in hot weather, workers sweat. Salt, lost in perspiration, must be replaced, or extreme weakness, even collapse, may follow. Sterling SalTabs provide needed salt in quick-acting tablets which contain a slight amount of corn starch which swells in contact with digestive fluids, making tablets fall apart so salt can be quickly absorbed. Easy to take, quick-acting SalTabs are compounded from a formula of the Research Department of International Salt Company, Incorporated. Ask your supplier for them, or write direct to International Salt Company, Incorporated, Scranton, Pa.

• Sterling dispensers, clean, convenient. 1,000 tablet capacity—$4. 500 tablet capacity—$3.75. SalTabs are packed in boxes of 250, 500, 1,000 or in bulk. Write for folder.

Sterling SALTABS
T. M. Reg. U. S. Pat. Off.
The quick-acting salt tablets

The publications briefly described in this service department are prepared by manufacturers' technical experts. The data they contain on equipment supplies and prevention methods applies to varied phases of occupational hazard problems. Note those items desired on coupon below and send to Occupational Hazards, 812 Huron Rd., Cleveland, Ohio. See pages 30 and 31 for New Products.

283—SALT DISPENSER
An attractive bulletin describing the new unbreakable salt dispenser, recently placed on the market by the Milburn Company, is ready for distribution.

284—SAFETY EQUIPMENT CATALOG
The Boyer-Campbell Co. has just released a new one hundred and thirty-six page catalog, titled "Everything For Safety." Ready reference can be made to all types of safety devices.

285—DUST CONTROL
Booklet describing Kirk-Blum Company's dust control installations in the Metal-Working Industry is now available. See inside front cover.

286—MATERIALS HANDLING
Lewis-Shepard Sales Corporation announce the publication of the Silver Anniversary Edition of their catalog covering over 175 items in the material handling line.

287—SKIN PROTECTION
Pro-Tek, a skin protective cream, is discussed in a booklet issued by the DuPont Company. See page 00.

288—ADHESIVE BANDAGE
Forty-six techniques employing the use of elastic adhesive bandage are outlined in a booklet released by Becton, Dickinson & Company. A sample strip is also offered.

289—ENTRAINMENT SEPARATOR
In a new 4 page bulletin the Schneible Company points out how their Separator recovers and salvages moisture, oil solvents and other liquids. Miniature engineering sketches enhance the value of the bulletin.

290—SAFE PRACTICE CHART
A convenient chart showing the colors used in standard classification of piping systems to identify fire protective systems and piping carrying dangerous or valuable materials has been prepared by the Jones & Laughlin Steel Corporation.

291—WORKER COMFORT
Morton Salt Company details the problem of heat fag among workers and suggests methods of controlling this occupational hazard in a new pamphlet entitled "Heat Fag Among Workers." See page 00.

292—GROUP WASH FOUNTAINS
A complete line of stainless steel group-wash fixtures are fully described in a splendid booklet prepared by the Metal-loid Engineering and Manufacturing Company. The booklet is liberally illustrated.

293—SOUND CONTROL
A brochure outlining the practical application of acoustical sound control treatments is a late release from the Johns-Manville Company.

294—FUME ELIMINATION
Modern methods for the elimination of hazardous fumes are discussed in a new bulletin issued by the Ruemelin Company.

295—SAFETY SHOES BUYERS GUIDE
Helpful facts for the buyer of safety shoes will be found in the new guide book prepared by the Lehigh Safety Shoe Company.

FREE LITERATURE COUPON Clip out and paste on postcard or enclose in envelope.
Mail to: OCCUPATIONAL HAZARDS, 812 Huron Road, Cleveland, Ohio.

Nos. of desired items .....

Firm Name .....

Your Name .....Position .....

Street and Number of Your Firm .....

City .....State .....
FL-20

AVOID SKIN IRRITATION

PRO-TEK is a greaseless cream which helps to protect the skin from physical contact with materials which may stain or cause irritation. Send for free booklet. E. I. du Pont de Nemours & Company (Inc.), Dept. O-3, Wilmington, Del.

Tune In: DuPont "Cavalcade of America" every Tuesday, 9 p.m. E.D.S.T. over N B C

DU PONT

PRO-TEK

REG. U. S. PAT. OFF.

THE INVISIBLE GLOVE

Use **Band-me-Quick** new Individual Bandage. Made of Gauztex. Self-adhering gauze sticks only to itself—not to flesh. Medicated pad. 9-inch length. Keeps out dirt yet air circulates freely. **No Throw-Aways.** Each Band-me-Quick cellophane wrapped. **Stays fresh.** 100 to a box. Order from supply house or GENERAL BANDAGES, INC., 508 S. Dearborn St., Chicago.

GAUZTEX

Band-me-Quick

The Safety Valve

(Continued from page 2)

scribed forms. And, thirdly, the analysis of these records, which will be held strictly confidential. This analysis is expected to yield specific ways and means whereby the participating companies can cut down their number of lost workdays.

Cooperating with the Foundation in the study are the U. S. Public Health Service and the American Association of Industrial Physicians and Surgeons. These organizations collaborated in working out the forms to be used in recording the lost time and will aid in the analysis.

The preliminary report points to the complexity of the subject and shows that age, occupation, income, sick benefit plans, and methods of tabulating absences all enter into the problem. The report adds:

"Many employers who have never analyzed their absenteeism record would receive a shock if they were to find how frequent are absences of more than a week's duration and how many days their employees lose by such absences." Records compiled by the U. S. Public Health Service for a group of companies showed that sickness and non-occupational injuries, resulting in more than seven days' incapacity, caused 96 absences among over 1,000 male workers.

Short-time disabilities lasting less than eight days are the greatest concern to industry, particularly those of one, two and three days. These are caused mostly by colds and respiratory infections, gastro-intestinal upsets and a variety of causes not clearly defined, and among females, dysmenorrhea. The important factors among the ill-defined causes are mental and emotional instability. Further, some companies find that employees with poor health records also had poor safety records.

The plan for the survey requires the filling in of a punch card for absences and the recording on other forms the number of workers under observation. Absenteeism records will reveal the line of action necessary to obtain a maximum reduction in the amount of time lost from work through disability. They will call attention to excessive rates from certain causes and should serve to improve these conditions.

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Irving B. Hexter, President — L. P. Aurbach, Vice-President

Jack Weiss, Associate Editor — William S. Papworth, Associate Editor

How Precision Grinding Wheel Company Controls Its Dust Problems

A review of the types of dust control apparatus utilized in this plant, their practical application and the results obtained.

PROGRESSIVE industrial firms realize that the dust nuisance takes an annual toll of millions of dollars. They know that dusty operations increase light bills, result in expensive machinery repair, cut down the efficiency of workers. Many firms have rid themselves of the dust nuisance by installing positive collection dust control systems and high powered vacuum cleaning equipment.

An outstanding example of how a firm has made dust control equipment fit its every manufacturing process is offered by the Precision Grinding Wheel Company of Philadelphia, Pa.

Mr. R. L. Cotterill, Mechanical Engineer at the Precision plant, has had 20-odd years of experience in dealing with dust problems and we are glad to have him review his experiences in OCCUPATIONAL HAZARDS.

"The products we manufacture are grinding wheels and other shapes of solid abrasives. These are made mostly of two types of abrasives: Silicon Carbide and Aluminous Oxide. Both are electric furnace products, produced at temperatures upward of 4000 degrees F. Both approach the

Fig. 1. An unusually fine dust is created by pulverizing clay for vitrified bonds in this impact type pulverizer.

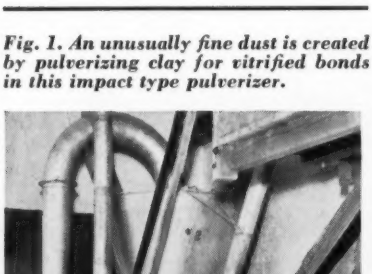


Fig. 2. The dust laden air is lifted by air current to an overhead cyclone collector.

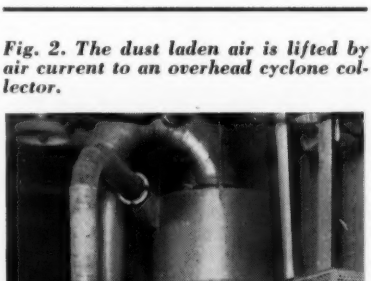


Fig. 3. Atmospheric dust is collected at the back of room, washed, reconditioned and recirculated.

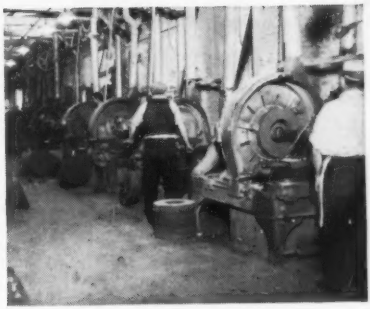


Fig. 4. Close-up of finishing department where grinding wheels are provided with hoods and exhaust piping.

diamond in hardness. After being crushed and graded to size, these sharp cutting particles are bonded together with various binders, such as clays, glass, sodium-silicate, rubber, shellac or bakelite. The mixture of abrasive grit and binder is moulded to shape, heated to the fusion temperature of the binder, cooled, finished to exact shape and tested.

"Many of these operations are necessarily dusty. In view of our experience with dust in other plants, it was determined in the beginning to install the best dust suppression equipment then obtainable.

Operations

"Our clays for vitrified bonds are pulverized in a Raymond impact type pulverizer, being so finely divided that it will all pass a 200 mesh screen. See Figure #1. It is lifted by air current to an overhead cyclone collector, then chuted into storage bins. See Figure #2.

"The air travels in a closed circuit, returning from cyclone collector to pulverizer, to pick up more dust. A slight vacuum is maintained in the entire system, so that there is no oozing of dust from joints or bearings. Though the material being handled is fine and fluffy as face powder, the entire pulverizing operation is quite dustless. The prepared binders and grit are chuted from storage bins on the second floor to mixers on the first floor.

"In our press department, where small batches of dry or semi-dry materials are being handled from mixers to scales and to moulds, small quantities of dust are being created at so many different points that to collect the dust at its source is impractical. The usual procedure is reversed in this case. A gentle stream of clean air is directed upon the operators. The dusty air being driven away is collected at the back of the room, washed, reconditioned and recirculated. Constant temperature and humidity are maintained, regardless of outside weather conditions. Speed of air at duct orifices is 350 ft. per min. An entire change of air is accomplished in 8½ min. See Figure #3.

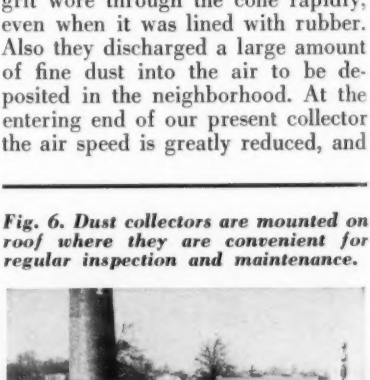
Fig. 7. Vacuum cleaning equipment serves a real need in keeping this plant free from floating dust.

"The finishing department, in which the rough wheels are dry finished to exact size, presents the worst dust producer. At the beginning we collaborated with the B. F. Sturtevant Company in the design of our finishing machines and building, in order to obtain the best possible dust elimination. Easily movable machine hoods were devised, which covered all the wheels except the part worked upon. The hoods serve not only as dust retainers but also as a catch-all for fragments of wheels which may break while being worked. Where wheels are mounted in chucks, the entire hood is rolled away from the chuck on ball bearings to give access for chucking the wheel. See Figure #4.

"Exhaust ducts connected to these hoods keep a stream of air moving across the point of dust generation and into the duct, sufficient to prevent the spread of dust beyond the hood and into the room. Air speeds or C.F.M. alone do not make an efficient dust exhaust system. As much depends on the hoods being correctly designed to collect the dust at its source. Air speed in our hoods, however, varies from 200 to 400 ft. per min. We have two 30 in. diameter mains in which the air speed is about 3400 ft. per min. This results in a complete change of air in the department, in about 5 or 6 min. Air to replace this rapid removal is drawn in through overhead openings to avoid draughts. This incoming air is heated in cold weather.

"We use two 60 in. exhaust fans in the finishing department. Twice as much power is used for dust exhausting as for driving the machinery. The dust is discharged to dust collectors built on the roof. See Figure #6. These are of the baffle plate and water spray type. In the beginning, we used the usual cyclone collector. These were costly to maintain because the grit wore through the cone rapidly, even when it was lined with rubber. Also they discharged a large amount of fine dust into the air to be deposited in the neighborhood. At the entering end of our present collector the air speed is greatly reduced, and

Fig. 6. Dust collectors are mounted on roof where they are convenient for regular inspection and maintenance.



the coarser particles are dropped at the first baffle plate. At the second and third baffle plates, finer sizes are dropped. These particles are a valuable by-product, suitable for polishing grain. The very fine dust is precipitated at three further baffle plates by fine water sprays.

Well Pleased with Vacuum Cleaning Equipment

"One of our best pieces of dust suppression equipment is a 5 H.P. vacuum cleaner, costing about $1000. One man gives this his entire attention, cleaning the entire plant. See Figure #7.

"Former methods of cleaning with brushes and brooms threw large quantities of dust into the air, chasing it from place to place, but never effectively disposing of it all. The vacuum cleaner, by means of long tubes, cleans walls, ceilings and over pipes and beams just as easily as the floor, and it gets into those dark cluttered corners that the broom never saw.

"The proper test of the efficiency of dust suppression equipment is in a dust count of the air being breathed. We believe the time is not far distant when standards will be established which will specify the maximum, safe dust count for various types of dust. Meanwhile, we feel that, while we can look through the 200 ft. length of our finishing room and see not the slightest haze of dust, we are on the safe side. Many of the men in this department have worked there continuously for the 20 years we have been in existence. All pass our periodical physical examination with good reports.

The IMPROVED FAIRWAY *for* '40
Lowest Prices in Fairway History

FAIRWAY HOPPER EXCHANGE DISPENSER

Fairway Laboratories introduce this year a new low-price tablet dispenser already receiving much favorable comment. The inexpensive hopper is replaced with each filling. Well worth investigating.

FAIRWAY JUNIOR AND MIDGET PLASTIC DISPENSERS

Have been brought to the highest perfection. Visible discharge, positive one-tab.-at-a-time mechanism, dust and moisture proof, easy to refill, streamline.

FAIRWAY "Q-D" (QUICK DISSOLVING) SALT TABLETS
A new addition to Fairway Services in response to growing interests in fast-dissolving tablets

LOWEST PRICES IN FAIRWAY HISTORY
Combat summer slumps in production caused by heat sickness with Fairway Services. New price list and literature on request

FAIRWAY LABORATORIES, Inc.
1534 N. HADLEY STREET ST. LOUIS, MO.

SALT keeps workers on the job!

. . . how regular use of salt tablets can eliminate worker disability and lost time due to heat fag and cramps.

AS RECENTLY as within the past ten years it has been necessary to close down certain industrial operations during periods of unduly hot weather. This is particularly true in the case of steel mills and other industries where artificial heat is used over a wide area. This excess of dry heat made it impossible for workmen to carry on their duties normally. As recently as June, 1933, 12 men were put to bed with heat cramps in one day in one of our well-known steel mills.

The frequency of heat cases in steel and other industries led to the carrying on of exhaustive research into this whole problem to find an answer to why men are overcome by heat. Significant work was done at Youngstown, Ohio, in the steel mills, and at Boulder Dam. Scientific authority believes that heat cramps are associated with rapid dehydration of an individual engaged in strenuous muscular activity.

You are probably familiar with the story about the group of men working in a steel mill who seemed impervious to the effects of heat, while all around them their fellow-workers had severe cases of cramps and heat exhaustion? Upon investigation it developed that the men who seemed free from the effects of heat were in the habit of gathering to drink beer after work each evening. During the course of sitting for an hour or so, drinking beer, and eating pretzels, they consumed a considerable quantity of salt from the pretzels. This fact was singled out, and provided the sugges-

Salt is an invaluable aid in those industries where the application of artificial heat causes men to perspire freely.

tion that a salt deficiency might be the cause of susceptibility to heat cramps. Now, we don't know whether this is a true story. We suspect that it is a bit of industrial folk-lore. Nevertheless, it's a good tale about how the use of salt was discovered as a preventive measure in controlling heat cramps.

Recent studies of the subject, particularly those at Youngstown, indicate that the average, normal workman takes in somewhat over 5 quarts of water during an ordinary 8 hour day. During this same period, only seven per cent of this amount of water is excreted by the kidneys. The rest of this water, obviously, must be given off in perspiration, breathing, and elsewhere.

Sweat accounts for the removal of the greater portion of this water from the body. Many analyses of the chemical composition of sweat show that the salt content may vary from 0.05 to 0.5%. Sweat composition varies from man to man, and from time to time. In any event, taking these figures as general outside limits, they show that a workman loses salt through perspiration equal to 3 to 30 grams in 8 hours. The usual intake of salt with food is from 10 to 20 grams per day. It is easy to see, therefore, that such a condition may lead to salt depletion and heat cramps.

As a result of these studies, arrangement was made to add 0.1% salt to the drinking water provided for the men working in one mill. Except for the complaints from the men as to the taste of the water, no difficulties were encountered, and the mill worked through the whole summer without a single case of heat cramps or heat exhaustion. This during the period when it had often previously been necessary to close the mill on account of so many men being overcome with the heat.

The next year the salt treatment was applied to a larger group of about 12,000 workers. Out of all these men, only 11 cases of heat cramps and 11 cases of heat exhaustion were reported all summer. Remember, at the beginning of this article we said that it was not uncommon to have this many men overcome during one day!

New Men Need Special Care

This last experiment brought out an interesting fact. Of the 22 men described above who were overcome by heat, 18 of them were doing hot work after either transfer from a cold job, or after a layoff. This brings out the very important fact that new men on the job need special attention. They should have special instruction by the foreman, and they should take special care to see that they keep their salt equilibrium by taking an adequate supply of salt tablets.

Further research on this point indicated that the salt content of the sweat is perceptibly higher during the first few days on the hot job. It may decrease as much as 50% in salt content during the period of adaptation. Therefore, the salt requirement of a new, unconditioned workman on a hot job is likely to be twice as high as the seasoned worker.

Even here, though, bear in mind that the salt content, and salt requirement, of the individual workman vary. No set figure will apply to many men. This further explains why some men seem more susceptible to heat cramps than others.

Because of the conclusive nature of the researches into the question of heat cramps, the use of salt tablets in industry is now very widespread. Of course, the greatest hazard to workers is in the artificially heated operations where heavy physical labor is necessary. The steel mill is a good example of this. But, other kinds of work result in salt depletion of the body. Even some offices provide salt tablets for their workers. If your plant induces substantial sweating on the part of your workers, it is likely that you could profit from the use of salt.

100% Freedom

You are probably fully familiar with the effects of heat cramps and exhaustion. You know how they can take a worker out of production and put him on the sick list. And you know the more serious results of severe cases. You know what can happen to your costs when you have to shut a plant down on account of prohibitive external heat. In few cases of workers' health do we have a clear-cut picture of preventive procedure as we do in preventing these disabilities from heat cramps.

It is conclusively proven that proper use of salt tablets gives almost a 100% freedom from heat cramps. The only objection to the use of salt in the steel mill case cited above was the slightly unpleasant taste of the water when the salt had been dissolved in it. It was learned that when the water was kept at around 46 degrees F. that the taste of the salt was barely noticeable. But, it is not now necessary to put salt directly into the drinking water. While it is likely that no complaints would come from the workmen, you can be on the completely safe side and use salt tablets.

It is now possible to buy tablets made under sanitary conditions, made with the same care that drugs and medicines are made. Dispensers are available that will keep the tablets clean and dry until the worker removes the tablet, one at a time, as required.

Dispensers should be placed by all drinking fountains, and wherever else indicated. Workmen should be told about the proper use of salt in preventing heat scramps, and their cooperation in regular use of the tablets must be had.

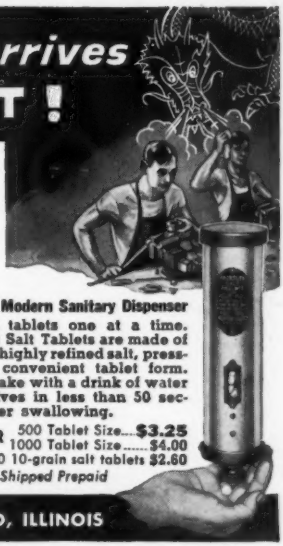
Probably one of the most interesting things about the whole salt treatment is its economy. One case of heat cramps or heat exhaustion costs your company more than a whole year's supply of tablets and dispensers.

Heat fag and cramps do not belong in your plant. If you have more than the absolute minimum of heat cases, the fault rests solely on your shoulders. When disability is preventable, as it definitely is in the case of heat cramps, workers on the sick list are an indictment of management!

Good Idea.

In a Michigan foundry, the Safety Engineer sprinkles yellow calcimine dust over misplaced objects and potential accident hazards. Everyone knows what the yellow stuff means, and none of the foremen want any in their department.

When HEAT-FAG arrives Workers need SALT !



HEAT FAG takes its toll — then workers slow up — tire quickly — grow irritable. Their bodies need SALT — to replace the salt sweated out by heat and heavy work.

Provide Salt Tablets to workers who sweat. It results in higher efficiency — fewer days lost and more contented employes. *Write for folder: "Heat Fag Among Workers."*

MORTON'S SALT TABLETS

Morton's Modern Sanitary Dispenser
Delivers tablets one at a time. Morton's Salt Tablets are made of the most highly refined salt, pressed into convenient tablet form. Easy to take with a drink of water — dissolves in less than 50 seconds after swallowing.

DISPENSER 500 Tablet Size....**$3.25**
1000 Tablet Size.....**$4.00**
Case of 9000 10-grain salt tablets **$2.60**
Shipped Prepaid

MORTON SALT COMPANY CHICAGO, ILLINOIS

Lens Authority Honored

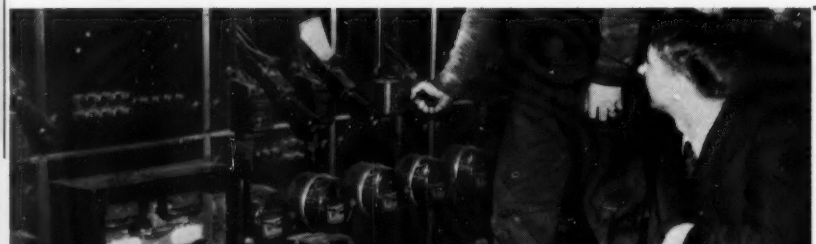
In recognition of his numerous contributions in the field of optical science, Dr. E. D. Tillyer, American Optical Company research scientist

and internationally known lens authority, (above) received an award from the National Association of Manufacturers designating him as a "modern pioneer on the American frontier of industry." Dr. Tillyer has developed new eye-diagnostic instruments, trial lens sets, lens testing instruments, and various types of corrective, absorptive and protective lenses. In addition, he has made contributions in astronomy, military fire control, radio, motion pictures and television. A total of 125 patents has been issued to him.

Daily Pledge.

In a certain paper mill, the practice was adopted of having every employee every day, sign a safety pledge. It was done in several departments for three or four years by the men of their own volition. After a while a group of a hundred men worked several years without a lost-time accident. The interest spread to other departments, so that it is now a universal practice.

Protective Equipment for the Health and Safe



• *Protective rubber matting provides insulation from ground.*

IN CONSIDERING the safety of electrical maintenance men, we must consider the types of hazards, or the ways in which electricity can produce injury. We know from experience that most personal injuries result through such abnormal conditions as accidental ground, poor contact, short circuit, or overload. However, we must keep in mind the proper selection of equipment, the proper installation of such equipment, the use of insulating devices, proper space in which to work, protective grounding, rubber mats, proper inspection, etc.

A tremendous increase in welding operations during recent years indicates the most common hazards that face the maintenance worker are (1) fumes, smoke, and gases; (2) radiation from the arc; (3) fire; (4) electric shock.

Fumes, smoke and gases always can be successfully handled through carefully controlled ventilation. If it is necessary to weld in small or confined spaces, or inside of tanks, adequate forced ventilation should be provided to carry away the gases or the welder should be supplied with an air respirator. When welding parts that have been painted with white lead or welding cadmium plated parts

Proper ventilation control, protective clothing, masks, helmets, shields, gloves, all are necessary for the well-being of an electrical maintenance man.

and Safety of Electrical Maintenance Men

By H. W. ARLIN

Supervisor Industrial Relations, Westinghouse Electric & Manufacturing Company, Mansfield, Ohio

it is absolutely necessary that forced ventilation be provided.

Workers should be protected against the radiations from the welding operation, consisting of a mixture of ultra-violet light, visible light and infra-red rays. The hands, arms and face should be protected from these radiations, and from burns, by wearing the proper protective clothing. Masks, helmets, or shields should be used to protect the face and eyes. Our experience indicates welding shades numbers 3 to 5 satisfactory for acetylene welding, and shades number 6 to 12 for electric arc welding; the higher numbers being used for the higher amperages. We also find that many welding goggles today are designed with ventilating ports arranged so that sparks cannot enter, and provided with metal parts that resist corrosion. Another important item is the protection of by-standers or workmen working nearby, as such individuals should also wear protective goggles. There is also a possible fire hazard from welding operations, and a danger of burns to the operator, although both these items are definitely preventable.

Electric shock in arc welding is also possible, and the operator should use care in handling the electrode holder and in changing electrodes so that no shock is received. When changing electrodes the workmen should keep themselves insulated from the ground or metal objects nearby. These are the first things the average welder learns.

Our company considers precaution and safe practices in welding so important that a welding school, or series of classes, has been conducted to teach proper storage, care and handling of oxy-acetylene welding and cutting equipment.

Clothing

The type of clothing worn is a very important factor in preventing electrical accidents. Electrical maintenance men should be careful about wearing metal buttons, celluloid collars, celluloid or metal cap visors. Clothing should be well-fitted, and as nearly fire-resisting as possible. In the few accidents that I have seen resulting from electric flashes, burning clothing has added to the seriousness of the accident. Clothing equipped with snap buttons to provide for quick removal of garments is preferable when working with power circuits.

The proper use of rubber gloves,

(Continued on page 30)

HOW B
SAFET SH

EVERY INDUSTRY needs a thousand and one different safeguards to protect men against their own carelessness. And often it's up to one man to specify or purchase all these items. Obviously, he can't be an expert in everything. But he should know **what to specify** in order to get the product that will give the best possible performance on the job.

To help Safety Engineers and other executives in charge of safety to order safety shoes more intelligently . . . to help you be sure that you are getting the utmost for your safety shoe dollars, we have included in our new 1940 Catalog a complete, non-technical guide to Safety Shoe buying.

This handy, helpful manual deserves a place on every safety man's desk. **SEND FOR YOUR COPY TODAY!**

LEHIGH SAFETY SHOE CO., E., A

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* what safety shoe sole materials to specify for use on oily floors . . . hot floors . . . floors wet with caustic?

* what kind of leather safety shoes to order for jobs or departments where slips and falls are frequent on dry floors . . . on damp floors?

* what safety shoe construction to order for yard gangs . . . indoor workers?

* the meaning of the terms shank, counter and vamp . . . and why they are important in buying safety shoes?

* WHAT TO SPECIFY in order to get the longest-wearing, most comfortable, SAFEST POSSIBLE shoes for every job . . . every man . . . every floor-condition?

* WHY Lehigh makes 60 different safety shoe constructions—8 different sole constructions? Which is right for each job?

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AFETY SHOE BUYERS' GUIDE section of the new

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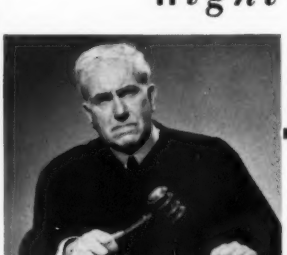
Right off the Docket



The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Death from Heat Prostration Brings Award

The employee, 33 years old, was engaged in loading sacks of cement, weighing nearly 100 lbs., upon a truck. He carried the sacks from the inside of the store to the truck, which was located outside the building. The temperature on the day in question varied from a maximum of 104 degrees to a minimum of 78 degrees. The humidity was around 76. After loading the truck the employee went inside and there collapsed from heat prostration. A week or so later he died.

The Court reversed a decision of the Industrial Commission and made an award. The determining question in the case was whether the employee was subject to a greater hazard or strain than the general public in the community. The Court found that a combination of the hot weather together with the exertion required in carrying the cement sacks constituted a special and peculiar situation not common to the public as a whole.

Cavanaugh vs Industrial Commission (Ohio) 63 Oh App 256 (Nov. 1939)

* * *

Work in Heat Over-Taxes Previously Weakened Heart

The father of the claimant was employed as a ditch digger. While at work one hot May day, and while hot and sweaty, he paused to get a drink of cold water. Immediately after drinking, he cried out, and fell dead.

The Court decided that the worker had met his death in an accident arising out of and in the course of his employment. The death was found to have resulted from heart failure and, though the heart was in a weakened condition, such condition was aggravated, accelerated and intensified by the work he was performing, and the cold water he drank.

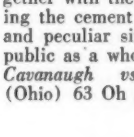
Williams vs Cities Service Gas Co. (Kan.) 99 Pac. 2nd 822 (March 1940)

* * *

Employee Gets Additional Compensation Nine Years After Original Accident

In 1929, the plaintiff, while working as a miner, was struck on the head and body by falling rock. He received compensation by agreement for his injuries. In 1938, 5 years after he had left his employment, and over 9 years after the original accident, he filed a petition for further compensation claiming he was totally disabled from traumatic neurosis caused by the injuries sustained in the accident in 1929.

It was found from the evidence that the accident in 1929 was the cause of the



traumatic neurosis and an award for total disability was made.
Rajkovich vs Oliver Iron Mining Co. (Mich.) 290 N.W. 365 (Feb. 1940)

* * *

Compensation Given for Disability Resulting from Frozen Feet

The plaintiff in this case was employed as an attendant in a gasoline filling station. While at work in the winter of 1929, he froze both his feet. He made an application for compensation for disability to his right foot, which was granted. Subsequently, his left foot became disabled, and an application to modify the previous award to include the disability to the left foot was filed.

The Court made an award holding that the accidental injury by the elements or forces of nature is received in the course of and arising out of the employment where the injured employee is subjected to a greater hazard in his employment than that to which other persons in the same locality are subjected; this principle applies to accidental injuries by freezing in cases in which the peculiar danger to the injured employee from exposure to cold weather compelled by his employment is a hazard greater than that encountered by others exposed to the cold in the particular community. His employment made it necessary that this employee be out in the cold continuously for long periods of time servicing cars and consequently his hazard was greater than that of people generally who happened to be out doors in the locality.
Kaiser vs Industrial Commission (Ohio) 136 O.S. 440 (March 1940)

* * *

Typhoid Fever Held Not Compensable as Accidental Injury

The claimant was employed as a laborer engaged in cleaning an irrigation ditch. There was no live or running water in the ditch. It contained muddy pools of waste water, in which were found dead dogs, cats, chickens and fish, garbage, and debris. The employee contracted typhoid fever, and a claim was filed for compensation.

In order for compensation to be granted in this case, the Court said, the typhoid fever would have to fall within the meaning of the phrase "accidental injury in the course of and arising out of employment." The Court held that it did not; that the laborer was not conscious of any mishap, hazard, fortuitous occurrence or misadventure.
Hoffman vs Consumers Water Co. (Idaho) 99 Pac. 2nd 919 (Feb. 1940)

* * *

Conditions of Employment Justify Award for Heat Exhaustion

The accident in this case occurred in St. Louis in the month of August. The temperature on the day in which it happened ranged from 84 degrees to 104 degrees. The employee was engaged with a number of others in applying a ceiling to a street car under construction. During the work the men stood on a trestle which brought their heads within a few inches of the ceiling of the car. Electric drills were being used in the work. Eight or ten electric lights were installed in the car. The injured employee complained of the heat about 2 P.M., but continued working until quitting time which was at 3 P.M. He then went home where he collapsed. He was taken to a hospital and found to be suffering from heat exhaustion. He died about a week later.

The Court found that the temperature in the car particularly near the ceiling was substantially hotter than it was outside; that the difference was due to the confined space, and the use of electric lights and electric drills. Since the character of the employment intensified the risk and made it greater than that to which other persons in the locality were subject, the Court held that the death arose out of and in the course of employment, and was compensable.
Wessel vs St. Louis Car Co. (Mo.) 136 S.W. 2nd 388 (Feb. 1940)

Digested and Compiled by
HILTON E. ROBERTS
Member of the Ohio and New York Bar.

X-Ray—A Valuable Asset to your Health Program

By CLOYD M. CHAPMAN
Powers X-Ray Products, Inc., Glen Cove, N.Y.

AS INDUSTRY becomes more familiar with occupational diseases which affect the respiratory tract, it appreciates to an increasing degree the necessity for knowing the physical condition of its workers. Many cases have come into the courts recently where emphasis was placed on the state of health of a worker at some certain time. Both in the matter of settling disputed questions of a worker's health, and in determining illness early, X-ray plays a vital part in accurate diagnosis.

The great difficulty management has in combatting these afflictions of the lungs—pneumoconioses, which includes silicosis, asbestosis—is in not realizing that they exist before it's too late to do anything about it. The clinical picture of occupational diseases of the lungs is not sharply defined in its early stages.

X-ray changes this. With proper X-ray procedures, and proper interpretation, the diseases may be discovered in their earlier stages, and proper preventive measures enlisted.

A program of X-ray examination as a pre-employment requisite gives management some semblance of control over the health of workers. If a weak chest condition is revealed, it is possible to remove that man from hazardous occupations. No industrialist will deny that a trained, highly skilled worker is an asset. His ability and general attitude is just as good as the unfit worker's is bad. This applies to ordinary, everyday conditions.

When that worker's condition becomes more serious, when he becomes actually disabled, then it starts to cost management real, hard dollars. X-ray thus becomes a profitable tool for management in checking the health of workers; in establishing conditions of health at the time of the X-ray examination; and in discovering early the signs of affliction.

New Procedures

Time was when X-ray examinations were cumbersome and expensive. If the worker wasn't sick, the examination nearly scared him to death. All this is changed now.

The mass X-raying of large groups of employees has become an efficient, economical procedure and employees in literally hundreds of plants, particularly those in which there is a health hazard, have been X-rayed always under medical supervision.

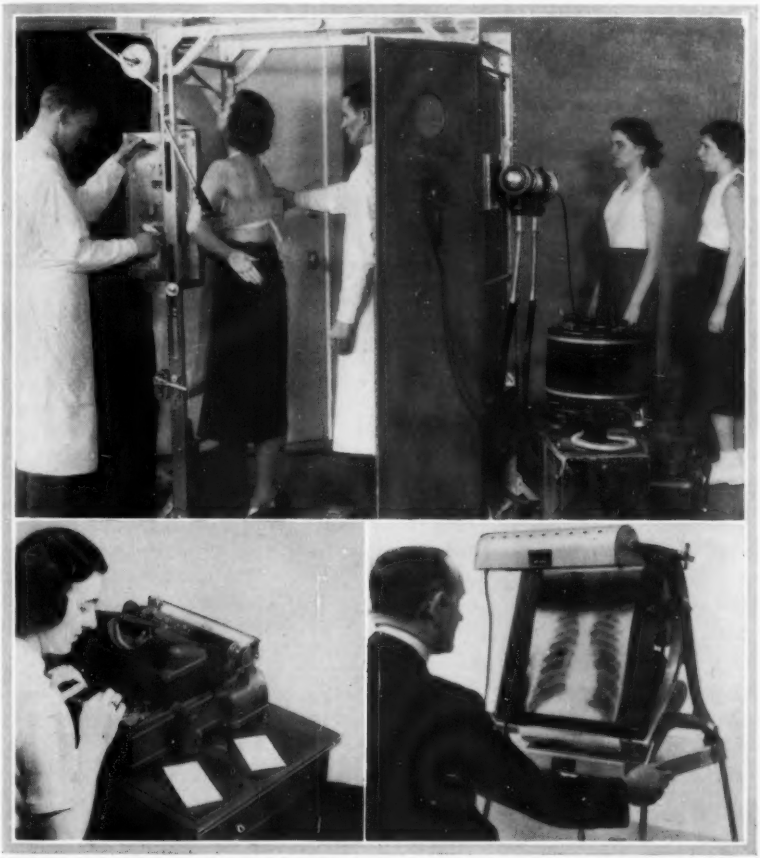
This modern rapid method uses paper X-ray film in rolls, each roll capable of taking one hundred chest pictures, fourteen by seventeen inches in size. They are made at a rate of about two a minute or a hundred and twenty-five to a hundred and fifty an hour. Only a few minutes time away from work is required.

A mobile and portable X-ray unit is transported in a small delivery truck to the plant or office. The em-

ployees are lined up to the unit. Men are stripped to the waist; women are provided with cotton halters.

On the way to the X-ray unit, each subject receives a lead card on which is stencilled the name and such other data as may be wanted. This card is X-rayed with the employee so that each radiograph bears on its face all desired information and case data.

One by one those in the line step in front of the X-ray film holding box which is adjustable to the height of the subject, who is carefully positioned by the operator, an immobilizing band is clamped across the back to prevent involuntary movement and, in a fraction of a second, the X-ray exposure is made. The next in line then steps into place and the process is repeated. When a roll of paper film, containing a hundred pictures,



has been exposed it is removed from the box and another put in.

More than twelve hundred C.C.C. boys have been X-rayed in one day with one unit, but in factories and offices a rate of six to eight hundred a day is a convenient operating schedule.

The exposed film is developed in the roll and the strip of X-rays are then read with the aid of a mechanical viewing cabinet at a very much more rapid rate than can be done with individual detached radiographs.

The presence of the essential identification and case data on each picture make continual reference to a case record book unnecessary. Findings can be written or indicated by private code or symbols upon the face of each radiograph. By this method the overall cost of screening out those in need of further examination is reduced to but a fraction of that of former methods.

What Does It Mean?

After X-ray has indicated the condition of the worker (either he is a well man, or he should be examined further), management can know that it is not sending susceptible men into occupations for which they are unfit. Every time a man is sent into a job from which he may contract an occupational disease, that company is just simply gambling its good money that he won't succumb.

When it is possible to tell which men are bad risks and which are not, isn't it worthwhile to find this out? X-ray will help.

WHAT'S YOUR SAFETY PROBLEM?

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If it's for Safety—we have it! In Pulmosan's complete stocks of safety equipment—and broad experience—you will find the answer to safety for workers in every hazard, in every occupation, in every industry. Let us know your problems or needs for recommendation and quotation. Write for our complete catalog.

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Aprons	Inhalators
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Face and Eye Shields	Protective Clothing
First Aid	Respirators
Foot and Toe Guards	Safety Cans
Gas Masks	Safety Shoes
Gloves	Safety Signs
Goggles	Salt Tablets & Dispensers
Hard Hats	Waste Cans
Helmets	Welding, etc.
Hoods	

WRITE FOR COMPLETE CATALOG

Republic Steel's Housekeeping Program

By B. T. DYE, Safety Supervisor, Republic Steel Corporation
Warren, Ohio

A discussion of the methods employed in developing and operating the good housekeeping program of this large organization

Part II

Next, let us consider what is to be looked for when making a good housekeeping inspection. All buildings should be kept in good repair, well painted and glazed; walls, columns, machines, etc., free from unnecessary marking or defacing of any nature.

Areas around buildings should be kept cleaned of all debris, such as stone, brick, scrap lumber, and other things which may accumulate over a period of time.

The interior of buildings should be well-lighted, and light reflectors cleaned frequently. Lighting standards should be in keeping with work to be done at all times. Poor lighting is frequently responsible for the accumulation of much material and rubbish in out of the way places.

Aisleways should be plainly marked and kept free from any obstructions, such as material extending over lines or blocking or other material extending into passageways. Hand trucks or power trucks should never be allowed to stand in any passageway or aisleway. Material in warehouses should be properly blocked and stored to eliminate falling hazards and other conditions which go to make up unsafe and unsightly housekeeping. All blocking should be properly piled up and stored.

Dust hazards are another important feature in housekeeping. Quantities of obnoxious dusts should not be liberated and allowed to accumulate in or on buildings.

Sanitation is also watched closely. Locker rooms should be of ample size, well ventilated and lighted. Ceiling hangers are preferable to lockers, however, where lockers are used, they should be kept clean inside and out. Tools, rags, dirty clothing, etc., should never be allowed to accumulate in, on, or under lockers. Floors should be scrubbed thoroughly and disinfected at least once every eight hours and properly cleaned at end of each turn.

Toilets should be adequate for the number of people and properly cleaned. Floors scrubbed and disinfected daily. Urinals and commodes should be properly scrubbed and disinfected daily with free use of an organic cleaner at least once every week.

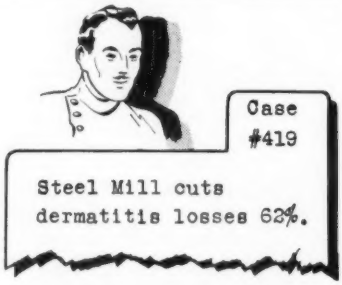
Having agreed upon a method of inspection and what is to be looked

for to eliminate further argument, it became necessary to outline just what constituted a demerit and also a method of evaluation of demerits.

This was accomplished by providing a list for each superintendent and foreman, broad in scope and narrow in detail. This list, as prepared, was composed of 28 articles or rules with each article or rule evaluated as shown in the accompanying table.

These specific demerits and their evaluations having been agreed upon, it became necessary to form an approved consolidated report, grading each and every department as seen by the inspector. This we worked out on a handicap basis, handicaps being figured on previous inspection reports covering a 12-month program. These handicaps are arrived at by taking the average monthly demerits of each department based on their previous experiences and substracting them from the department who has the highest figure, which figure is known as par. Using 100 as a handicap for the department having the par figure, the remaining handicaps are arrived at by adding their previously figured handicaps to 100. Thus, if all departments are average clean for any one month, all would have the same rating with respect to par. On our monthly report the final standings of the departments are figured according to their per cent of par. In other words, number of demerits, added to the handicap and divided by par equals their per cent of par. Departments whose per cent of par is over 100% are considered below average clean, and departments whose per cent of par is under 100% are considered above average clean. A consolidated report is reached by a department on the basis of its per cent of par. The one with the best standing being placed first, and so on down the line, and in order to make keener competition, we have developed a trophy. This trophy is properly labelled and at the executive safety meeting is presented to the superintendent whose department had the poorest rating for the month. The trophy is left in his care and keeping for the ensuing month, and may be exhibited where and as he may see fit, but must not be stored away or hidden as some will try to do.

(Please turn to page 32)



A big steel mill employing 13,000 adopted Formula SBS-11 for safe, rapid cleansing of mill employee's skin. After 2 years the Safety Director reports that Formula SBS-11, due to its high bacteria removal power, has been responsible for a 62% reduction in losses formerly caused by dermatitis.

Formula SBS-11 will give comparable results in your plant, at a cost of under 1c a week per worker. Write today for a generous FREE TRIAL SUPPLY to Sugar Beet Products Company, 340 Waller St., Saginaw, Michigan.

Formula SBS-11

THE WASHWORD OF INDUSTRY

General and Specific Conditions Which Constitute Demerits Under the Plant Clean-up Campaign

Rule No.	Demerit Value	
1.	1	Unnecessary writing, printing, marking or otherwise defacing lockers, cupboards, machinery, buildings, or equipment of any kind.
2.	2	Signs of any kind not hung properly or in an unreadable condition.
3.	2	Departmental bulletin boards allowed to become unsightly through poor arrangement or old out-of-date bulletins.
4.	1	Clothing, gloves, refuse, lunch containers or any other material on top of, or underneath or hanging on outside of lockers.
5.	3	Accumulations of old greasy clothing or rubbish inside of lockers, cupboards, or tool boxes.
6.	1	Lockers which are unsightly through lack of paint or proper up-keep.
7.	1	Refuse cans which are not painted green and wooden barrels and kegs, pasteboard cartons, etc., being used as refuse containers.
8.	5	Oily rags or waste not contained in safe metal containers with metal cover.
9.	5	Papers, bottles, rags, on floors, machinery, benches, in yards or any other locations except as provided for.
10.	5	Any unsanitary or unclean condition existing in toilets, washrooms, and showers; failure to use disinfectants as provided.
11.	1	Buildings allowed to become unsightly due to lack of necessary repairs or upkeep such as broken windows, loose sheeting, bad floors, etc.
12.	3	Disorderly arrangement of material in process or to be processed.
13.	4	Any material improperly piled in buildings or yards.
14.	5	Unnecessary accumulations of scrap, refuse, paper, dirt, obsolete material or parts piled inside or outside of buildings.
15.	2	Dirty floors, walls, windows, light fixtures, etc., in offices.
16.	3	Dirty foot-walks or stairways and platforms, ice or oil on steps or platforms.
17.	1	Castings, oil drums, cable reels, oxygen and acetylene tanks, etc., scattered about the plant instead of in places provided for same.
18.	1	Any unnecessary material on roofs of buildings and furnaces.
19.	1	Any unclean condition not applicable to work being done.
20.	4	Any unclean condition resulting from a completed job.
21.	5	Material of any kind hanging on, inside, or on top of any electrical equipment.
22.	5	Wooden lockers or cupboards containing any combustible material.
23.	3	Accumulations of oil, rags, sawdust or any other material under motors, switch panels or machinery.
24.	3	Dirty and unsanitary drinking fountains; failure of providing salt tablets where containers are installed or failure of salt ejector to operate.
25.	5	Material piled in front of fire extinguishers, hose houses or hydrants.
26.	1	Water, steam, oil or gas leaks.
27.	1	Misuse of safety locks.
28.	3	Any other dirty, disorderly or unsightly condition not otherwise listed.

This month in *Washington*

Industry's Stake In Safety

EVERY YEAR in the United States and Canada approximately 14,000 firms go out of business. As these failures are reported in the newspapers, trade and financial journals, we are given in each instance the so-called cause of the disaster—"over-expansion," technological changes," "business depression," "competition," "inefficient management," etc. Unless we happen to be the victim attempting to build a new structure out of the ruins in which we find ourselves, we shrug our shoulders and smugly say, "That can't happen to me."

The cause of tuberculosis is said to be the germ, bacillus tuberculosis. But, does the identifying and classifying of the microbe really disclose the cause of tuberculosis? Do we not also have to have in addition the fertile soil and bred of dirt and disorder in which the T B bug can take root and multiply? Do we not also usually find a low economic status, ignorance of sanitation and personal hygiene, poor housing, poor habits?

When we read every year of great floods "caused" by melting snows and spring rains do we give any thought to the farming method which let these same spring rains come coursing down the hillside, or to the destruction of our great forests whose trees can no longer absorb and hold back the melting snows?

So whether our campaign be for health preservation, the conservation of natural resources, or keeping a business out of the red, it is my opinion that we must cease talking of causes in the singular. We must speak, rather, of causative factors, divided perhaps, as I heard recently into the three P's—predisposing, provoking, perpetuating. Predisposing causes—the fertile soil in which business failures or the bacillus tuberculosis breed; Provoking cause, "the straw that broke the camel's back"; Perpetuating cause—that which al-

By W. T. CAMERON, Chief Safety Adviser, U. S. Department of Labor

lows the continuance of the disease or the situation, that which prevents or retards the cure of the disease.

While an accident or a series of accidents is seldom responsible for provoking or precipitating a business failure, the record of injuries and disabilities and maiming casualties on any company's record with its resultant human, material and economic waste, is certainly a predisposing factor toward bankruptcy. There is today a generally accepted doctrine that safety and efficiency and good management go hand in hand. So imbued has progressive management become with this philosophy that safety programs have become one of the important foundation stones upon which the business structure is built. Not an appendage or an accessory or an activity which is undertaken during good times, safety rather has been integrated into every successful business enterprise.

Accident Sequence

In analyzing your present safety program, or in setting up a tailor-made program to fit your establishment, it is important to do first things first and put the program on a pay-as-you-go basis. Mr. H. W. Heinrich has also established what he calls the "accident sequence" in which he compares the events which precede an accidental injury to a row of dominoes placed on end, so that when one is pushed over it causes the others in the line to fall.

The last dominoe in the line—the last event in the chain of circumstances—is the injury. Preceding the injury is the accident. For instance, a worker drops a casting on his toe. The dropping of the casting is the accident, the contact with the toe causes the injury.

Preceding the accident in the accident sequence, there is always either an unsafe act or an unsafe mechanical condition, or a combination of both. In this category we find unguarded machines, slippery floors and defective ladders; or unsafe practices, such as wearing loose sleeves or a flowing necktie around moving machinery. But we can go back a step further to the personal fault—the reasons why the man wore loose clothing around moving machinery. Did he know the rules? Was he properly supervised? Did he disobey instructions?

If we are really delving into the causes of accidental injuries, we may go back yet another step to that which is labeled for want of a better name, "social environment." Was he properly fitted for the job, or was he the round peg in the square hole?

To stop the accident sequence at as many points as possible the safety program should give consideration to:

(1) The placing of barriers between the accident and the injury—safety shoes, safety goggles, gloves, respirators, leggings, etc.

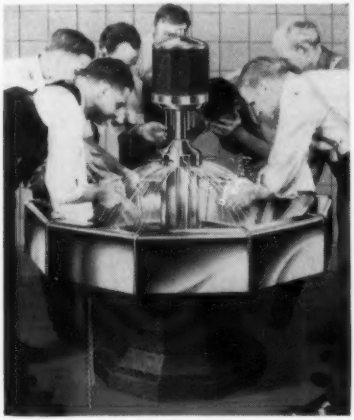
(2) The prevention of accidents by machine guards, safe equipment, good housekeeping, etc.

(3) The development of conscious safe work practices through safety education, safety inspiration, shop safety rules.

(4) The development of self-conscious safe work habits through job training.

(5) The employment of workers physically, psychologically and temperamentally fitted to the job, either already well skilled in their trade or capable of development through training into a safe, efficient worker.

WASHROOM EQUIPMENT. New stainless steel groupwash fixtures is a recent development of the Metalloid Engineering and Mfg. Company. Fixtures are available in designs to accommodate from 4 to 10 users. The line includes various designs of shower head with individual or group control, hot and cold water inlet valve, a mixing valve, trap and drain vent.



It is claimed that the fixtures have 100% rust-proofing efficiency.

PROTECTIVE MASK The All Purpose Gas Mask, now being introduced by the Acme Protection Equipment Company, is designed for the protection of industrial workers and also of firemen, and is described as combining all the advantages hitherto afforded by such a mask, with much more effective protection against smokes, fumes, and mists.

To all gas mask users who desire protection against smokes the manufacturer offers to send postpaid, free, a Canister Smoke Tester through which the smoke-filtering ability of any canister can be visibly demonstrated in less than a minute.

Among the merits of the new mask as described are full vision for the user, protection against carbon monoxide and other gases equal to that of any mask in similar use, a long effective life, and a harmless chemical reaction that gives warning by

odor as soon as protection against carbon monoxide commences to weaken.

WELDERS' EAR PROTECTORS New protection for welders' ears is the subject of Mine Safety Appliances Company's Bulletin entitled "M.S.A. Welders' Ear Protectors." The Bulletin illustrates and describes a simple and practical device for preventing injury to the ears caused by entry of flying sparks or hot metal particles, consisting of two Ear Protectors made of close-woven, non-rusting screen

Additional information and descriptive literature on any of the products mentioned in this service department may be obtained by writing ***Dept. N,*** OCCUPATIONAL HAZARDS, *812 Huron Road, Cleveland, Ohio.*

THE FIELD

with leather binding, which are held comfortably in place over the ears by an adjustable spring steel headband. The ear protectors are deeply cupped, ample in size to avoid cramping the ear, and permit complete natural ventilation and hearing. The headband is worn around back of the

head, and does not interfere with the wearing of goggles, conventional welding helmets or any head covering, it is stated.

FIRE FIGHTING UNIT Clamped to the wall as a fixed system installation yet easily removed and carried as a portable unit, this new hose C-O-TWO system has greater fire-fighting flexibility. It consists of a 50-lb. size cylinder of carbon dioxide, a 50-ft. length of high-pressure, reinforced flexible rubber hose and a large discharge horn fitted with a quick-opening type valve for controlling discharge of gas from cylinder.

The flexibility of this unit makes it adaptable for those interested in protecting and extinguishing fires within the hose range of fixed hazards and yet having the means of moving that protection to any remote location where fire may break out.

V-BELT DRIVE UNIT BLOWER Flexibility of operation and low cost are features of the new Autovent V-belt drive unit blower. Capable of being set up for almost any motor combinations, the unit is compact, completely assembled, and ready to run. No more space is needed than for a regular direct connected blower.

The complete unit combines a Uniblade Type H blower operated by a standard frame motor and suitable V-belt drive and is available in wheel diameters ranging from 12½ to 25 inches.

Statements made in connection with any product mentioned in this service department are based on manufacturers claims. Although these claims are believed to be true, this magazine does not guarantee that to be the case.

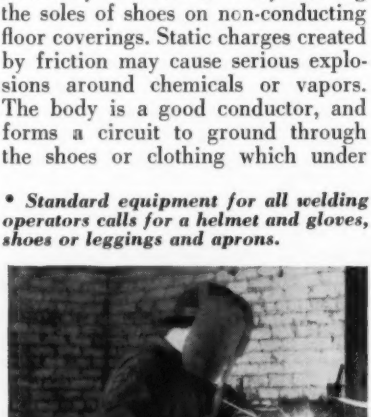
Protective Equipment for the Health and Safety of Electrical Maintenance Men

(Continued from page 15)

properly tested against air leaks and preferably reinforced with canvas for wearing qualities is an important item in safety. When not in use they should be kept in a cool place and kept free from oil. Regular inspection of rubber gloves is the safest procedure to follow.

Any discussion of safety clothing should also take into consideration the possible hazards of static electricity. Static charges may be generated by the clothes or by rubbing the soles of shoes on non-conducting floor coverings. Static charges created by friction may cause serious explosions around chemicals or vapors. The body is a good conductor, and forms a circuit to ground through the shoes or clothing which under most circumstances carries away static charges as fast as they are generated. Some people gather static charges much more rapidly than others, and the greatest danger occurs when the clothes are the driest. If it is known that a workman is susceptible to the accumulation of static he should not be employed where there is any possibility of danger of explosion.

• Standard equipment for all welding operators calls for a helmet and gloves, shoes or leggings and aprons.



Tools

The proper use of hand tools plays an important part in providing protection. A few years ago one of our electrical maintenance men had an ordinary test lamp in his hand and in pointing out the circuit breaker to be repaired, he carelessly touched a 2300 volt bus with the wires of the test lamp. This created a dead short on the lamp, followed by a heavy arc which jumped over to one of the grounded frames on which the circuit breakers were mounted. Of course the men were badly burned. Here was a case where workmen had a proper tool for certain applications, but through improper use, or carelessness, an accident resulted which could have cost them their lives.

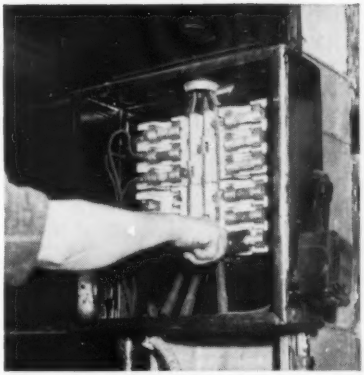
Just last year we had another accident resulting from a bad electric burn and in this case the electrician was using the wrong kind of hand tool. Engaged in changing a fuse, our man was standing on a box and using a pair of ordinary steel pliers. His foot slipped and the pliers caused a direct short-circuit, creating a bad arc, which put the man in a hospital and nearly cost him his life. This acci-

dent could have been prevented if the man had used a fibre fuse puller. Goggles should also be worn when changing fuses.

Another valuable tool for the electrical maintenance man is a padlock, so that switches may be locked open without the possibility of someone closing the switch.

A good example of a portable tool which is often carelessly handled and many times neglected is the portable extension lamp. Recently a workman in a building close to our factory received a fatal accident as the result of an electric shock from a 110 volt socket on a portable extension lamp. There seems to be a general belief among workmen that voltages of 110 to 220 volts are not harmful and can produce fatal shock only in cases where a man has a weak heart. This is an erroneous belief, as tests show that when an electrical circuit is completed through a wet contact any voltages in excess of 12 volts is dangerous. Where men work inside boilers, tanks, or sewers, a transformer should be provided with a 220 to 6 volt ratio. Even with this type of equipment the 6 volt side should be permanently connected to the lamp to prevent the possibility of ever plugging the secondary side into a 110 volt receptacle.

Extension lamps should be well guarded, and preferably should be shock-proof. If men are required to work around inflammable liquids, vapors or dusts, the lamp should be vapor-proof. Extension lamps are now available in which the current automatically stops if either glove or guard is broken. Lamps with frayed cords, loose connections, or broken sockets, should not be used. Extension cords should not be spliced and



• ***It is good policy always to use fibre fuse pullers when changing fuses.***

good usage does not permit dragging cords over nails, hooks, or tools, or over wet surfaces, as damaged insulation will cause short circuits and if inflammable vapors are present an explosion may result.

Portable hand tools should be provided with special ground wire. This is best obtained with a three conductor cable in which the third wire is attached to the frame of the tool and the opposite end is plugged into a three-wire receptacle through which the third wire is connected to a protective ground. Hand tools should be tested from time to time with a megger to determine the resistance between the circuit and tool frame. Portable tools should be kept cleaned and repaired. They should never be used where inflammable vapors are found.

Another piece of valuable protective equipment is that of switchboard matting or any material that will provide insulation from ground if the

(Continued on page 32)

Equipment for Electrical Men

(Continued from page 31)

operator is required to work in front of switchboards or other electrical equipment. When working around "hot" lines or equipment rubber linemen's blankets tested to about 30,000 volts should be used. Rubber sleeves to protect the arms and shoulders, that can be held in place by adjustable straps, should be available for electrical workers.

A recent study by one of our large utility companies covering a period of several years showed their most serious hazard to be that of injury from electric shock or burns. Further analysis showed that 43% of these accidents occurred during the months of July, August and September. Failure of employees to use the protective equipment provided, due to the discomfort of hot weather, resulted in an abnormal number of accidents and emphasized the value of personal protective equipment. The number of burns on the hands and forearms comprised 42% of the total number of injuries. The proper use of rubber gloves would have prevented this condition.

Therefore, if we are to safeguard our maintenance electrical men effectively, we must not only provide them with the necessary protective equipment, but we must also see that such equipment is continually used. It is also the responsibility of the maintenance supervisor to see that protective equipment is properly inspected and that inspection of electrical equipment includes a check-up to find out whether various kinds and pieces of equipment are provided that will operate, adjust and repair safely.

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Republic Steel's Housekeeping Program

(Continued from page 24)

We have also added zest to this program on a number of occasions by making an annual award to the superintendent who has been the keeper of the trophy most frequently during the previous year. Such awards have been in the form of white gloves, brooms, and on one occasion a live skunk.

Plan Now to Attend

1st ANNUAL MEETING

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION

THE Twenty-fifth Annual Meeting of The American Association of Industrial Physicians and Surgeons, together with the First Annual Meeting of the American Industrial Hygiene Association, will be held at Hotel Pennsylvania, New York City, June 4, 5, 6, and 7, 1940. This will be a four-day convention intensively devoted to the problems of industrial health in all of their various medical, technical, and hygienic phases, with particular stress on prevention and control of occupational hazards. Important programs have been prepared, and technical and scientific exhibits will be a feature of the convention.

The dinner on Thursday evening, June 6, will be the occasion of the presentation of the William S. Knudsen award for the year of 1939-40. All who have an interest in these phases of industrial health including industrial hygienists, safety engineers, chemists, plant engineers and personnel managers, are urged to attend as this program will have unusual value to all these groups.

NEW YORK JUNE 4-5-6-7

HOTEL PENNSYLVANIA

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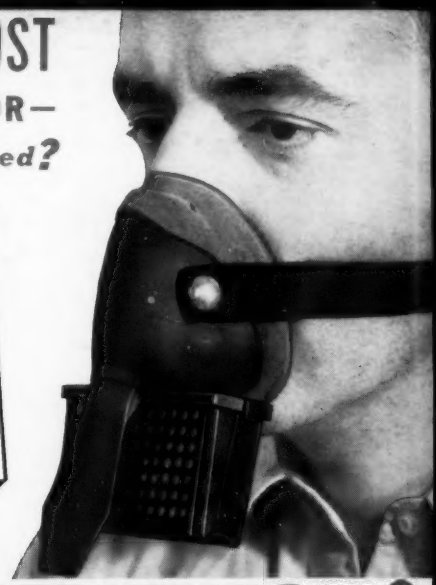

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Easy sanitation—a vital quality in dust respirators which are required by modern standards to be cleaned daily and sterilized at least each time of re-issue—is still another cardinal Dustfoe advantage. Dustfoe can be completely disassembled in less than one minute without use of tools. Every part (except filter) will withstand repeated washing and sterilizing, and the inexpensive throw-away filters permit renewal as frequently as necessary. The result, from the wearer's standpoint, is a respirator always as fresh and efficient as a brand-new unit —and from the maintenance angle, a truly serviceable and economical piece of equipment!

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